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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,020	11/20/2001	Pasi Tikka	297-010713-US(PAR)	9492

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EXAMINER
SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
2817	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/989,020	Tikka et al.
Examiner	**Group Art Unit**
Barbara Summons	2817

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 (three) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-43 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 21-29 is/are allowed.

☒ Claim(s) 1-6, 8-10, 13-19, 30-39, 41 and 42 is/are rejected.

☒ Claim(s) 7, 11, 12, 20, 40 and 43 is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Atta hment(s)

☒ Information Disclosure Stat ment(s), PTO-1449, Paper No(s). 5

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Pat nt Application, PTO-152

☐ Notice of Draftsperson's Pat nt Drawing Revi w, PTO-948

☐ Other _____

Office Action Summary

DETAILED ACTION

Claim Objections

1. Claims 1, 2, 15, 22, 30, 34, 38, and 43 are objected to because of the following informalities:

In claim 1, on line 14 thereof, note that "end said" should be --end of said--.

In claim 2, on line 9 thereof, note that "end said" should be --end of said--.

In claim 15, on line 9 thereof, note that "end said" should be --end of said--.

In claim 22, on line 9 thereof, note that "end said" should be --end of said--.

In claim 30, on line 15 thereof, note that "end said" should be --end of said--.

In claim 34, on line 22, thereof, note that "end said" should be --end of said--.

In claim 38, on line 13 thereof, note that "end said" should be --end of said--.

In claim 43, on line 7 thereof, it appears that "in that" should be deleted.

In claim 43, on line 8 thereof, note that "of" should be --is--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 39 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 39 recites the limitation "the second filter branch" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

6. Claims 1-3, 5, 6, 8-10, 14-16, 18, 19, 30-32, 34-36, and 42 are rejected under 35 U.S.C. § 102(e) as being anticipated by Bradley et al. U.S. 6,262,637.

Fig. 6 of Bradley et al. discloses a ladder filter structure 204 and a method for designing the filter structure 204 having a certain impedance level of 50Ω (see col. 13, ln. 30) and, inherently a target frequency response, the filter 204 having a first piezoelectric resonator 221 with a first resonance frequency (see col. 10, lns. 46-50) and which is connected to the input of the filter. The filter structure of Fig. 6 is changed to that of Fig. 7 by replacing resonator 221 with a plurality of resonators 355 and 357, thereby increasing power handling capacity of the filter

structure (see col. 13, lns. 59-61), and selecting the number of the plurality of resonators to be two or more (col. 14, lns. 5-8). The resonators 355 and 357 have the same resonance frequency as the replaced resonator and they maintain the filter impedance characteristics of 50Ω (see col. 13, lns. 50-56, and col. 13, ln. 66 through col. 14, ln. 3). Resonators 355 and 357 are the first and second resonators of the plurality of resonators connected in series, wherein the plurality is disclosed to be two, as in Fig. 7, or more (see col. 14, lns. 5-8), and the plurality of resonators is connected to the rest of the filter structure only through the resonators at the ends of the plurality. The filter also has third and fourth resonators 353 and 351 of a second plurality of resonators connected to the rest of the filter structure only through the third and fourth resonators at the ends of the plurality. Resonators 353 and 351 have a second resonance frequency equal to the first resonance frequency (i.e. because the parallel resonators all have equal frequencies col. 10, lns. 46-50), and the third and fourth resonators have the same resonance frequency and maintain the impedance level 50Ω of the filter structure, and wherein the third resonator 353 is connected to a second input conductor (i.e. the ground input conductor) of the ladder filter. The resonators are all bulk acoustic wave resonators formed on an unpatterned piezoelectric layer 78 (see Fig. 5). The filter structure 204 is a first filter branch, and there is a second filter branch 202 with a different passband (see Fig. 2). Regarding claim 34, the first and second filter branches include amplifiers 12 and 16 (see Fig. 1).

7. Claims 1-3, 6, 13-16, 19, 30, 31, 33-35, 37, and 42 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yuda et al. EP 1 030 448.

Fig. 9 of Yuda et al. discloses a ladder filter structure and a method for designing the filter structure inherently having a certain impedance level and target frequency response, the filter having a first piezoelectric resonator 24a (see e.g. Fig. 12) with a first resonance frequency and connected to the input 22 of the filter. The resonator 24a of Fig. 12 is replaced by a plurality of resonators including first and second resonators 24a-1 and 24a-2 in Fig. 9 which may include two, as shown, or more resonators (see e.g. pg. 8, lns. 56-58), to thereby increase the power handling capacity by selecting the number or the plurality of resonators (pg. 8, ln. 58 through pg. 9, ln. 2). The first and second resonators 24a-1 and 24a-2 have the same resonance frequency as the replaced resonator and they maintain the filter impedance characteristics (see pg. 7, lns. 3-8). Resonators 24a-1 and 24a-2 are the first and second resonators of a plurality of resonators connected in series, wherein the plurality is connected to the rest of the filter structure only through the resonators at the ends of the plurality. The filter also has third and fourth resonators 24b-1 and 24b-2 of a second plurality of resonators connected to the rest of the filter structure only through the third and fourth resonators at the ends of the plurality. Resonators 24b-1 and 24b-2 have a second resonance frequency equal to the first resonance frequency (i.e. because in ladder filters the series resonators all have equal frequencies, pg. 8, lns. 29-31), and the third and fourth resonators have the same resonance frequency and maintain the impedance level of the filter structure (see pg. 7, lns. 9-13). The resonators are all surface acoustic wave resonators. The filter structure of Fig. 9 is a first filter branch (see 17 in Fig. 7 and pg. 11, claim 9), wherein second filter branch 16 has a different passband, and the first and second filter branches inherently

include power amplifiers/low noise amplifiers (not shown, see e.g. the art used in the previous rejection as evidence).

8. Claims 1, 2, 4-6, 13-15, 17-19, and 42 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sakamoto et al. JP 7-74584.

Fig. 3 of Sakamoto et al. discloses a ladder filter structure and a method for designing the filter structure inherently having a certain impedance level Z1 and Z2 (Fig. 5) and target frequency response, the filter having a first piezoelectric resonator 25 with a first resonance frequency and connected to the input 21 of the filter. The resonator 25 of Fig. 3 is replaced by a plurality of resonators including first and second resonators 41a and 41b with reflectors 17 in Fig. 1 which may include two, as shown, or more resonators (see section [0019] of the attached machine translation), to thereby increase the power handling capacity by selecting the number or the plurality of resonators. The first and second resonators 41a and 41b have the same resonance frequency as the replaced resonator and they maintain the filter impedance characteristics (see sections [0014] and [0016], and Figs. 2, 4 and 5). Resonators 41a and 41b are the first and second resonators of a plurality of resonators connected in series, wherein the plurality is connected to the rest of the filter structure only through the resonators at the ends of the plurality. The filter also has third and fourth resonators 51a and 51b of a second plurality of resonators connected to the rest of the filter structure only through the third and fourth resonators at the ends of the plurality, and wherein resonator 51a is connected to a second input terminal (i.e. the ground input terminal see Fig. 5). Resonators 51a and 51b have a second resonance frequency

different from the first resonance frequency (i.e. because in ladder filters the series resonators have different resonant frequencies from the parallel resonators), and the third and fourth resonators have the same resonance frequency and maintain the impedance level of the filter structure (sections [0014] and [0016]). The resonators are all surface acoustic wave resonators.

9. Claims 1, 6, 13, 14, 19, 30, 31, 33, 34, 35, 37, 38, 39, 41, and 42 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nishihara et al. JP 10-303698.

Fig. 12 of Nishihara et al discloses a ladder filter structure and a method for designing the filter structure inherently having a certain impedance level and target frequency response, the filter having a first piezoelectric resonator S1 with a first resonance frequency and connected to the input a1 of the filter. The resonator S1 of Fig. 12 is replaced by a plurality of resonators including first and second resonators S12 and S11 which may include two, as shown, or more resonators (see section [0047] of the attached machine translation), to thereby increase the power handling capacity by selecting the number or the plurality of resonators (see section [0046]). The first and second resonators S12 and S11 have the same resonance frequency as the replaced resonator and they maintain the filter impedance characteristics (see sections [0045] and [0046] and [0048]). Resonators S12 and S11 are the first and second resonators of a plurality of resonators connected in series, wherein the plurality is connected to the rest of the filter structure only through the resonators at the ends of the plurality. The resonators are all surface acoustic wave resonators. Regarding claim 30, the filter of Fig. 12 is a transmit filter in a first filter branch Tx (see Figs. 5 and 6 and sections [0044] and [0048]) with a different passband from the second receive filter

branch Rx. Regarding claims 34 and 38, amplifiers (not shown) must inherently be provided, especially a power amplifier to boost the transmit signal and low noise amplifier for the receive signal, in order for the device to function (see other art of record as evidence).

Allowable Subject Matter

10. Claims 21-29 are allowable over the prior art of record.

11. Claims 7, 11, 12, 20, 40, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest a filter structure or method of making such a structure comprising each of the specifically recited combinations of features/steps, especially including: bulk acoustic wave resonators "not formed using a single unpatterned piezoelectric layer" (see claim 21, last four lines, and claims 11 and 12); or lattice filters (see claims 7 and 20); or bulk acoustic wave resonators in a transmit filter (see claim 40)[note Bradley et al. discloses a receive filter]; or the steps recited in claim 43.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shimamura et al. U.S. 6,208,223 discloses using a plurality of series connected surface acoustic wave (SAW) resonators in a parallel arm of a ladder filter to increase power handling capacity (see Figs. 4-6) and using the filter in a duplexer with amplifier (Fig. 7).

Ito JP 2001-156588 discloses using a plurality of series connected SAW resonators in a series arm of a ladder filter to increase power handling capacity (see the abstract and Fig. 1).

Takayama et al. JP 2001-285025 discloses using a plurality of series connected SAW resonators in a parallel arm and a series arm of a ladder filter to increase power handling capacity (see the abstract and Figs. 5, 10, 12, 14, and 15) and using the filter in a duplexer Fig. 1).

Hickernell U.S. 5,949,306 discloses that it is known to replace a single SAW resonator with two resonators and maintain the proper filter impedance (see the abstract, the last two lines).

W.P. Mason U.S. 2,045,991 (Fig. 15) and U.S. 2,222,417 (Figs. 8 and 9) each disclose lattice filters with a plurality of bulk acoustic wave resonators connected in series.

Taniguchi et al. JP 9-205343 discloses using a plurality of series connected SAW resonators with equal finger pitches (i.e. resonance frequencies) in a parallel arm of a ladder filter to increase power handling capacity (see the abstract, lns. 1-4 and Figs. 4, 6, 7, and 9) and using the filter in a duplexer (Fig. 11).

14. Any inquiry concerning this communication should be directed to Barbara Summons at telephone number (703) 308-4947, FAX no. (703) 308-7724, receptionist's no. (703) 30-0956, Supervisory Examiner Bob Pascal (703) 308-4909.

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Art Unit 2817

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